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(54) Title of the invention	CATV SYSTEM AND ITS RECEPTION TERMINAL		
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## SPECIFICATION

## 1. TITLE OF THE INVENTION

CATV SYSTEM AND ITS RECEPTION TERMINAL

## 2. SCOPE OF PATENT CLAIMS

(1) A CATV system in which multiple terminals are connected to a center by cables and picture signals are sent to the terminals from the center, wherein:

said center is equipped with a modulator which multiplexes character information related to the picture signal source with a picture signal and a modulator/transmitter which modulates the multiplexed picture signal to a specific wavelength;

said terminal is equipped with a detector which receives a picture signal sent from the center and detects character information from that picture signal, a character generator which modulates the character information into image information based on the output of this detector, and a superimposing means which superimposes the image information output from this character generator with a video signal in said picture signal; and

a character image based on said character information is superimposed with a video picture reproduced by a television receiver connected to said terminal.

(2) A reception terminal in a CATV system which is connected to a center by a cable and is used in a CATV system in which character information related to a picture signal source is multiplexed and this multiplexed picture signal is received, equipped with:

a tuner part which receives said picture signal sent from the center, a detector which detects character information from the picture signal tuned by this tuner part, a character generator which generates image information based on the character information obtained by this detector, and a superimposing means which superimposes the image information output from this character generator with a video signal in the tuned picture signal; and

a character image based on said character information is superimposed with a video picture reproduced by a television receiver connected to

said terminal.

### 3. DETAILED DESCRIPTION OF THE INVENTION INDUSTRIAL FIELD OF APPLICATION

This invention relates to a CATV system and its reception terminal in which character information related to individual picture image sources is sent from a center as in-band data, for example, and this in-band data is demodulated at each terminal and a character image based on the character information is superimposed with a received video signal.

#### PRIOR ART

CATV systems are typically configured such that they connect a center and reception terminals installed in each of multiple households, for example, with a fixed line, transmit programs supplied through on-air signals received on the center side or programs supplied within the center, and reproduce the programs for viewing with a television receiver in each household connected to the terminal.

In this case, programs resent after on-air signals are received can be viewed free of charge, while there is a charge for unique programs created within the center or programs such as newly released movies, which results in a source of revenue for the company operating the CATV system.

However, on the viewer side, the content of the program presently being viewed (the program name, for example) cannot always be easily confirmed from only the picture or sounds appearing on the television receiver, so the viewer performs an operation to search for a program of interest by successively increasing or decreasing the reception channel with a remote control.

In such a case, information such as the program name cannot easily be evoked by only the pictures or sounds of each channel that successively appear, and this makes the viewer prone to switching to the next channel from a program that may have ordinarily been of interest.

There are many cases in which newly released movie programs are of interest to viewers, and this [type] of program is often broadcast as a pay program by the company operating the CATV.

Therefore, in this state in which programs of

interest to viewers cannot be easily found, it is not possible to increase the viewer ratings of pay programs, which is an indirect cause of revenue losses for the operating company.

#### PROBLEM TO BE SOLVED BY THE INVENTION

This invention was created out of consideration of the present conditions described above, and it attempts to provide a CATV system and its reception terminal capable of providing convenience to viewers and simultaneously promising revenue increases for the operating company by displaying the program name or program content as character information on pictures that appear.

#### MEANS FOR SOLVING THE PROBLEM

In order to solve the problem described above, the CATV system and its reception terminal of the present invention are configured such that character information related to a picture signal source is multiplexed with a picture signal on the center side of the CATV system and sent, while character information is detected from the received picture signal on the terminal side, and this is converted into a character picture by a character generator based on this detected character information.

#### EMBODIMENT

An embodiment of the present invention will be described hereafter based on the drawings.

Fig. 1 is a block diagram explaining the CATV system of the present invention. In this system, multiple terminals B are connected to a center A by cables C. A main line cable C is drawn from center A, and the terminal B of each household is connected to a drop cable C' drawn from turnouts D established at prescribed locations along main line cable C.

This center A has a head end 2 which converts the frequencies of on-air signals obtained from an outdoor antenna 1 and sends them to the terminal side, and sends picture signals obtained from a video tape recorder or a video disk player (not shown in the figure) to the terminal side.

A modem 4 which converts the data of each terminal B and a center computer 3 is connected to

this head end 2, and components such as an external connection device 5 such as a keyboard for providing commands to this computer 3 and a disk player 6 for monitoring the operating state or data are connected to this computer 3.

This computer 3 is equipped with functions for calculating the viewing time of pay programs at each terminal B and the viewing charges from the programs viewed, and accumulating this data and issuing an invoice with a printer connected externally as necessary.

In addition, center A is equipped with modulators 13-15 which draw audio signals from multiple sources 7-9 obtained from the video tape recorder or video disk player described above and multiplex the output of character information generators 10-12 related to each picture signal source with these audio signals.

Fig. 2 is a block diagram for explaining this operation. Simply stated, FM audio signals 7-9 drawn from picture signals receive the output of character information signal sources 10-12 related to the picture signals and are AM-modulated by modulators 13-15 based on the output of these character information sources 10-12.

These AM-modulated audio signals are combined with the video signal in each picture signal and are each converted to different RF frequencies by modulators/transmitters 16-18. These are provided to head end 2 through mixers 19-21 and are sent to cable C together with the recent on-air output.

On the other hand, the terminal B side has a basic configuration comprising a terminal box 22 installed in each household and a television receiver 23 which is connected to this box 22. A remote controlled commander 24 is included with this terminal box 22 as necessary, and it is configured such that various types of programs can be tuned by commander 24.

Fig. 3 is a block diagram showing an example of this terminal box on the terminal B side.

Picture signals transmitted through cable C enter an RF amp 26 through a turnout 25 and are applied to a mixer 27. A common PLL circuit (tuner part) 32 comprising a voltage controlled oscillator 28, a prescaler 29, a programmable divider 30, a crystal

oscillator 31, a phase detector 32a, and a low-pass filter 32b is connected to this mixer 27.

This PLL circuit 32 constitutes a first local oscillator, and intermediate frequency output that is tuned here is respectively applied to a high-pass filter 33 and a low-pass filter 34 and divided into video and audio signals. Audio signals obtained from low-pass filter 34 are applied to an AM detector 35. The demodulated character information obtained by this AM detector 35 is applied to a computation control circuit 36. A light receiving part 37 which receives the output from remote controlled commander 24 is connected to this computation control circuit 36, and this circuit controls whether to provide the demodulated character information to a character generator 38 by decoding the remote control code. Similarly, it receives a tuning data switching command from commander 24, at which time it sends data to tuning memory 39 and controls tuning with PLL circuit 32.

At this time, data corresponding to tuning information is sent to a data transmitter 40 from computation control circuit 36, and data transmitter 40 sends the data for the channel being viewed along with the terminal address data to center A through turnout 25.

On the other hand, when the demodulated character information is applied to character generator 38 by the operation of the remote control, character image information corresponding to the character information is generated by this character generator 38. This character image information generated by character generator 38 is superimposed with received video signals obtained by high-pass filter 33 in a superimposing circuit 41, and it is further mixed with audio signals obtained by low-pass filter 34 in a mixing circuit 42.

The output of this mixing circuit 42 is mixed with the output of a second local oscillator 44 in a mixer 43 and is converted into an RF open-channel signal, which is sent to the output line leading to television receiver 23.

Therefore, as shown in Fig. 1, a character image F showing the program title or content appears on

picture E of the program tuned by the terminal on television receiver 23 in a superimposed format.

This character image F can be displayed as a superimposed image or deleted by operating the remote control at the convenience of the viewer.

#### EFFECT

As can be seen from the above explanation, with this invention, character information related to individual picture signals sent from the center side is multiplexed with audio signals, for example, of the picture signals and sent. On the terminal side, after character information is detected from audio signals, for example, a character generator is activated, and a character image obtained from this character generator is then superimposed with the tuned video image. The invention is therefore convenient in that the user can immediately assess whether or not the program is of interest based on this character image.

In addition, the invention yields administrative advantages to the company that operates the CATV such as the ability to increase the viewing of pay programs.

Further, this invention can be realized using existing CATV systems directly by adding a function for sending character information to the center side and adding components such as a character generator for demodulating in-band data, for example, and

reproducing character images to the terminal side, so it can be implemented relatively easily and inexpensively.

#### 4. BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing an embodiment of the present invention.

Fig. 2 is a block diagram for explaining the operation of a part of this embodiment.

Fig. 3 is a block diagram showing an embodiment of the terminal side of this invention.

A...center, B...reception terminal, C...cable, D...turnout, E...received picture, F...character image, 13-15...modulators, 16-18...modulators/transmitters, 22...terminal box, 23...television receiver, 24...remote control commander, 32...PLL part, 35...AM detector, 38...character generator, 41...superimposing circuit.

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[see source for figure]

Fig. 2

[see source for figure]

16 modulator 1

17 modulator 2

18 modulator n

Fig. 1

Fig. 3

機上に、番組のタイトル或いは内容を示す文字列などがスーパーインボーズされた形で探し出される。

この文字画像とは視聴者の都會に感じて、ヨコ  
ン操作によりスーパインボーズさせて表示したり、  
又は消すこともできる。

〔妙 美 〕

以上の説明で明らかなどおり、この発明によると、センター端から送出する個々の映像信号の、例えば音声信号中に、映像信号に関連する文字情報を多量化して送信し、受信側においては、例えば音声信号より、文字情報を検出してキャラタクタジェネレータを駆動し、このキャラクタジェネレータより得られる文字画像を、チューニングされたビデオ画像にスーパーインポーズするようにしたので、視聴者にはその文字画像によって興味ある要因が苏る感覚に朝氣することができるといふ効果が計られる。

又、CATV 運用会社にとっては何利害關係ある

う復讐させるような運用も可能であるといった経営上の観点も浮かぶ。

又、この系譜によると、草野のCATVシステムをそのまま利用し、センター側に文字情報を送出する機能を追加し、又端末側には例えばインパンドデータを経済して文字画像を再生させるキャラクタジェネレータ等を追加させることで実現できるので、比較的容易にしかも安価に実施することができる。

#### 4. 画面の簡単な説明

第一回はこの発表の実施例を示したブロック題。

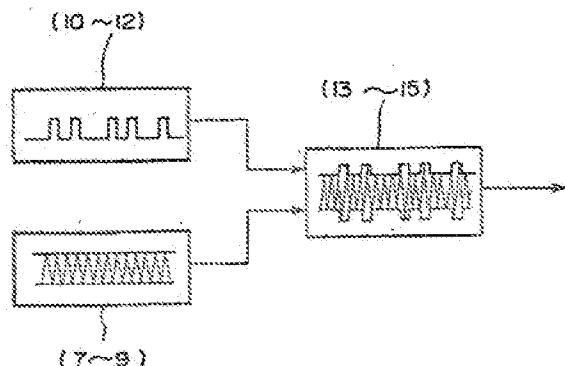
第2圖はその一部の動作を説明するためのグラフ圖。

第3圖はこの発明の発光素子の一実施例を示す  
たブロック圖である。

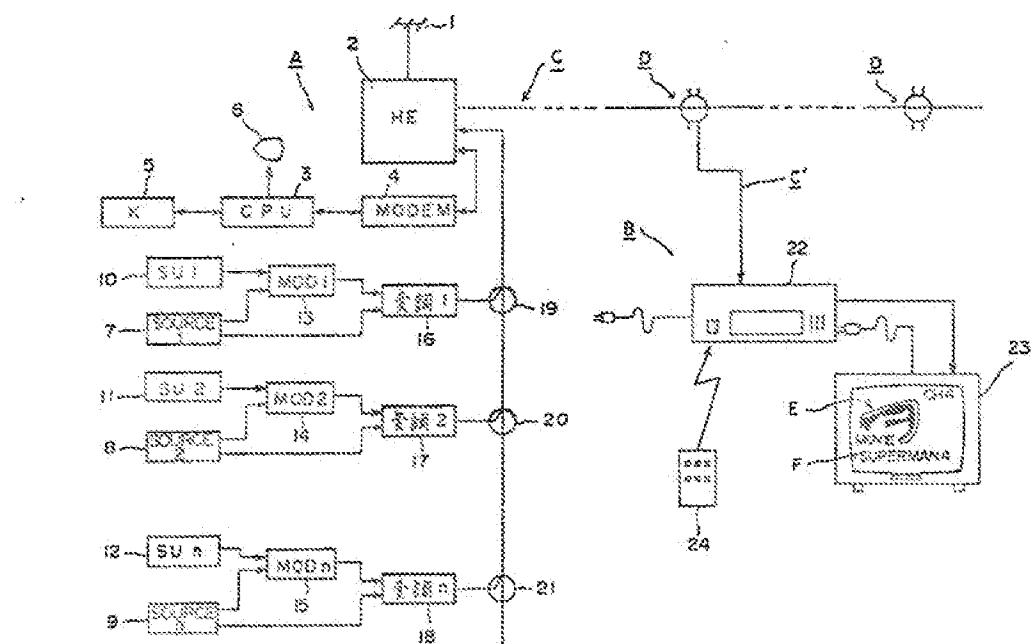
、A…センター、B…受信端末器、C…ケーブル、  
D…分岐器、E…受信映像、F…文字画像、1-3  
～15～モジュレータ、16～18～受信送出路、  
2-2～端末ボックス、2-3～テレビ受信機、2-4  
～リモコンコマンダー、3-2～P-L-L部、3-5～

AM機器、3.6～キャラクタジェネレーター、4.1～音源用。

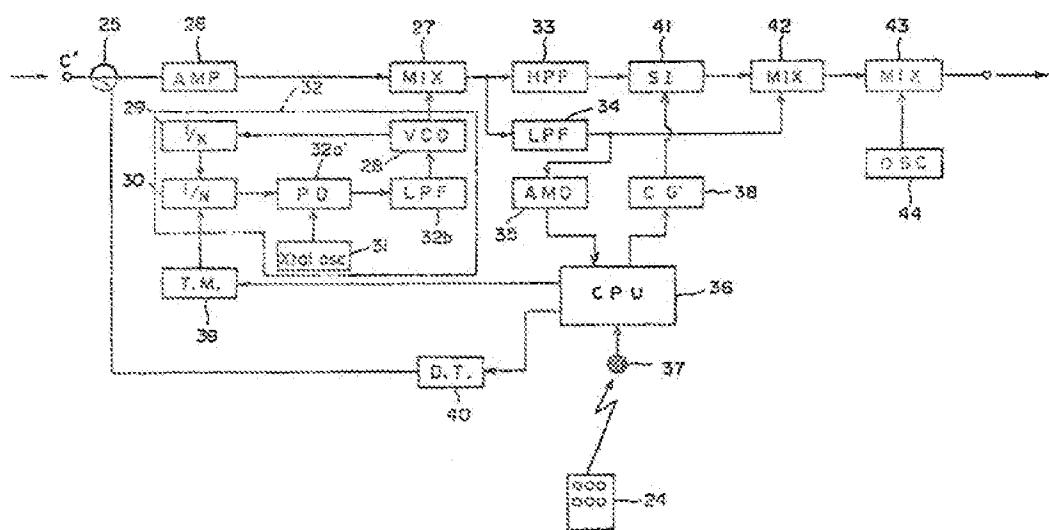
株式会社  
代表者  
新井秀雄



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